

■ AQUACULTURE SECTION

White teatfish aquaculture project in Kiribati

The Australian Centre for International Agricultural Research (ACIAR) has agreed to fund a project to assess growth and survival of hatchery-produced white teatfish (*Holothuria fuscogilva*) juveniles in the wild, in the atolls of Kiribati. This is a mini-project scheme that will be implemented by Kiribati's Ministry of Fisheries and Marine Resource Development (MFMRD) with technical assistance from SPC's Aquaculture Section.

The Kiribati Beche-de-mer Project was initiated in the mid-1990s as a result of concern over the overfishing of the commercial sea cucumber species, white teatfish (*Holothuria fuscogilva*). Hatchery production of white teatfish was initiated by the Kiribati government with assistance from the Japanese Overseas Fisheries Cooperative Foundation (OFCF). From 1997 to 1998, several hatchery runs produced approximately 8,000 juveniles but the joint project ended in 1999. Since then, the Kiribati government, through the Fisheries Division, has been maintaining small-scale production at the beche-de-mer hatchery and have released approximately 20,000 white teatfish juveniles into the lagoon. However, monitoring the releases has not yet provided good estimates of post-release survival rates of white teatfish juveniles. Juveniles are highly cryptic and rarely seen. Most of the released juveniles are never found during the monitoring period. Moreover, individuals found in surveys cannot be equivocally distinguished from wild stock. The economic and practical feasibility of restocking, in terms of the number of surviving adults versus the cost of hatchery production, is questionable unless

effective release and monitoring strategies are developed.

An earlier ACIAR-funded mini-project conducted in 2005–2006 used knowledge gained from another ACIAR project, "Optimal release strategies for restocking and stock enhancement of the tropical sea cucumber". The WorldFish Center in New Caledonia has developed optimum release methods for juvenile sandfish (*Holothuria scabra*), which could be applied to the related white teatfish, and the previous mini-project aimed to test the methods and develop suitable protocols for white teatfish. Although there were some good outcomes from the project, it did not present any data on survival and growth of hatchery-produced white teatfish released in the wild.

In early 2010, Kiribati's Fisheries Division had 500 juveniles (~4 cm length) ready for release at the Tarawa hatchery (Fig. 1). Knowledge gained from the previous study indicates that dark-coloured surfaces such as hard reef substrata with epilithic algae, and certain seagrasses, may

allow the juvenile white teatfish phase to be camouflaged and thus provide protection from predation. This mini-project will provide important insights into release strategies for a valuable sea cucumber species that is not cultured elsewhere in the Pacific, and enhance a priority research commitment of the Kiribati government over the last decade. The project does not involve any introduction or transshipment of new species, potential legal disputes or controversial issues.

Description of experiments

The specific objectives of the mini-project are to: 1) investigate survival and growth of hatchery-produced white teatfish juveniles in inshore marine habitats, and 2) build capacity of Kiribati aquaculture officers in release strategies and monitoring of released hatchery-produced white teatfish juveniles.

In January 2010, SPC's Aquaculture Officer went to Kiribati to develop small-scale release experiments to obtain baseline data on habitat preferences of ju-



Figure 1. Hatchery-raised juvenile white teatfish (*Holothuria fuscogilva*).

veniles. Because there were only small numbers of juveniles for the experiments, and because keeping track of those released in the past (one as recently as this year) has been unsuccessful, the juveniles were caged so that they could not escape from the release area (Figs. 2 and 3).

For this experiment, it was decided that several habitats had to be tested in order to identify where the juvenile white teatfish

would grow best and survive. The common habitats within the lagoons of Kiribati are varied, but some characteristic habitats that were selected include seagrass beds (Abaiang), hard substrates on lagoon pinnacles (Abaiang) and silty areas near mangroves (North Tarawa). Two cages were deployed at each site and each cage received between 30 and 35 young sea cucumbers that had been transported in plastic bags with oxy-

gen. The sea cucumbers were carefully released and placed in their new habitats.

Initial observations and issues to overcome

The sea cucumbers were observed during the following days of their release in the sea pens. They seem to have adapted to all three new environments because they were observed excreting sand only a few hours after being placed in cages. On the next day, the sea cucumbers placed in the hard substrata environment had already covered themselves with pieces of coarse sand and small rubble. A few days later the sea cucumbers in the silty area had travelled around the cage, staying mainly in the corners or in areas where they felt protected.

Unfortunately, some particularly bad weather conditions destroyed the set up several days later. This experiment, besides the initial observations, will therefore not achieve the goal of the project. The Fisheries Department has been working on organising further spawning of white teatfish in order to resume experiments later in 2010. The major problem faced by Kiribati Fisheries Division is that the white teat fish has been so heavily exploited through the atolls that even acquiring a dozen of fresh broodstock has become problematic.

For more information contact:

Antoine Teitelbaum
Aquaculture Officer
SPC
(antoinet@spc.int)

or

Karibanang Aram
Senior Fisheries Officer
MFMRD
(karibananga@fisheries.gov.ki)



Figure 2. Cages are built in the lagoon with steel rod, rope, chicken wire and small mesh netting.



Figure 3. The small size of the cages facilitates the monitoring of the released juvenile white teatfish.